

Greetings and welcome to the **OCTOBER 2016** edition of the WDFW Climate News Digest. Our purpose is to provide highlights of relevant climate change news, events and resources for WDFW staff. Feedback or suggestions for items to include in future editions are much appreciated – *thanks* to those who have sent links and references and please keep them coming.

Thanks for contributions this month from Wendy Connally, Jeff Lewis and Steve Desimone. Other sources for news include: DNR's eMission Control newsletter, NPLCC Climate Science Digest, Climate.gov, NOAA Climate Newsletter, and "BioClimate", the newsletter of the USGS Climate Science Centers. Contact Lynn to subscribe directly to any of these. Also, see a list of useful websites at the end of the newsletter.

WHAT'S HAPPENING AT WDFW?

State Agency Climate Adaptation Forum to be held December 6th (Lacey, WA)

WDFW is working with colleagues from the *Interagency Climate Adaptation Network* to host this event. The State Agency Climate Adaptation Forum is a one-day event designed to highlight work underway across agencies to build resilience to the impacts of climate change. The Forum will also focus on opportunities and barriers to increasing our effectiveness both as individual agencies and collectively across state government. The agenda will include panel presentations and interactive small groups, and will address topics such as drought response, flooding, ocean acidification, sea level rise and risks to infrastructure and ecosystem services, among others. Our target audience is state agency staff and managers, as well as climate adaptation partners from other organizations. If you are interested in attending, please check with your supervisor and contact Lynn (lynn.helbrecht@dfw.wa.gov) for the registration link and current agenda. Registration is free, but space is limited and pre-registration is required. A webex option will also be available for participants from outside Thurston County.

RESOURCES

EPA Releases New Fact Sheets on Climate Change *(from EPA)*

EPA released a series of fact sheets, "What Climate Change Means for Your State," which focus on the impacts of climate change in each of the 50 states and the territories of Guam and Puerto Rico. These 52 fact sheets compile information from previously published synthesis and assessment reports to provide a handy reference for state and local policymakers, businesses, and individuals who are looking to communicate impacts of climate change in a given state. **Learn more >>**

Visualizing the Warmest August in 136 Years *(from NASA)*

Check out this graphic from NASA's Earth Observatory program, which provides a 15-second look at how annual temperatures stack up from 1880 to 2016. **Learn more >>**

New public-private partnership helps leverage open data to build climate resilience

The White House has announced the public-private Partnership for Resilience and Preparedness (PREP), which will identify priority-information needs, reduce barriers to data access and usability, and develop an open-source platform to enable sharing and learning on the availability and use of data and information for climate resilience.

- [Visit the PREP beta website »](#)
- [Read the White House fact sheet »](#)
- [Read a case study here](#) *(from Planetsave)*

EPA's Climate Change Adaptation Resource Center *(from EPA)*

EPA has launched an online Climate Change Adaptation Resource Center (ARC-X) which provides local leaders in the nation's 40,000 communities with information and tools to increase resilience to climate change. Using a self-guided format, the Climate Change Adaptation Resource Center (ARC-X) provides users with information *tailored specifically to their needs*, based on where they live and the particular issues of concern to them. The system then provides the user with an *integrated package of information* that includes insights about the implications of climate change for the things they've indicated they care about. The ARC-X is available online at: www.epa.gov/arc-x.

Being Prepared for Climate Change: A Workbook for Developing Risk-Based Adaptation Plans (from EPA)

The *Being Prepared for Climate Change* workbook guides users to develop a risk-based climate change adaptation plan consisting of a vulnerability assessment and an action plan to reduce the most pressing risks.

- [Being Prepared for Climate Change: A Workbook for Developing Risk-Based Adaptation Plans \(PDF\)](#) (128 pp, 4 MB)

Climate Science Information Needs for Tribes in the Northwest: Results from an Online Survey of Northwest Tribes

This report summarizes results from an online survey administered in February 2016 to identify high-priority climate science research needs among Pacific Northwest tribes. The survey presented tribes with the opportunity to articulate their highest priority information needs, ultimately to be conveyed to regional climate researchers, scientists, and others studying these issues.

LEARNING OPPORTUNITIES

October 18th, (webinar), 1:00-2:00 pm (Pacific), “Cross-boundary Planning for Resilience of Endangered Oak Savannah and Coastal Douglas-fir Forest Ecosystems”

The goal of this project was to develop a landscape planning tool to answer the question: can we maximize the biodiversity benefits of conservation investments by prioritizing land parcels and landscapes for acquisition and stewardship? To do so, researchers provide a web-based prioritization tool and tutorial designed to identify ‘optimal solutions’ to user-defined problems in the conservation of Coastal Douglas-fir, Garry oak/Arbutus savanna, and maritime meadow bird and plant communities. [Register for the webinar here.](#)

October 25th, (webinar), 12:00 pm (Pacific), “Karst, critters, and climate change: A multidisciplinary evaluation of karst species vulnerability to climate change”

Karst aquifers provide a unique opportunity to investigate the effects of climate change on groundwater at timescales of human interest because these aquifers exhibit large variability in hydrologic responses, such as springflow (i.e. groundwater discharge) and water-table level (i.e. level below which the ground is completely saturated with water), at short timescales. By linking a global climate, regional climate, and hydrologic model, researchers can obtain input for a tool to measure species vulnerability.

[Register here.](#)

October 26th, (webinar), 10:00 a.m. (Pacific), “Navigating the Intersection: Western Water, Climate Change & Public Health”

Climate-driven changes in western water are already having direct impacts on public health. What lies ahead and how do we work together? [Register here.](#)

November 14-16, 2016. Seventh Annual Northwest Climate Conference, Skamania Lodge | Stevenson, WA.

The annual NW Climate Conference is the region's premier opportunity for a cross-disciplinary exchange of knowledge and ideas relating to climate impacts and adaptation. The conference brings together up to 400 researchers, resource managers and policy makers from academia, public agencies, sovereign tribal nations, non-governmental organizations, and the private sector, to share the latest climate science, challenges to infrastructure, industry, environment and communities, and adaptive solutions. For more information on the conference and to access the call for abstracts and special sessions, visit: <http://pnwclimateconference.org/>.

February 14-16, 2017. Conference: 2017 Climate and Health Summit in Atlanta, Georgia.

The central theme at the Summit will be "Translation of Science to Practice." We expect participation of experts from academia, federal agencies, and international organizations; practitioners from state/local health departments; and leaders in private foundations engaged in broad-ranging climate and health issues. If you have any questions, please contact ClimateHealthSummit2017@cdc.gov.

May 9-11, 2017. National Adaptation Forum. St. Paul, MN.

The National Adaptation Forum is the gathering of the adaptation minded. Since the Forum is created by and for the members of the adaptation community, the meeting focuses on issues of the day.

CLIMATE SCIENCE NEWS

Climate change increased chances of record rains in Louisiana by at least 40% (from NOAA.gov)

Three days of heavy rains devastated Louisiana in mid-August 2016. NOAA models find that warming due to greenhouse gases has made an event like that at least 40% more likely and 10% more intense.

How can we call something a thousand-year storm if we don't have a thousand years of climate observations? (from Climate.gov)

The summer of 2016 overflowed with extreme rain events. Here at Climate.gov, we've written about two of them: [the June floods in southern West Virginia](#) and [the mid-August floods in Louisiana](#). After the historic flooding in West Virginia in June, the National Weather Service said that in parts of West Virginia, 24-hour rainfall amount—more than 10 inches in some places—were a thousand-year event. We often do not have observations that go back 100 years, let alone 1,000. So how do scientists figure that out? The answer lies in statistics.

Ocean conditions contributed to unprecedented 2015 toxic algal bloom (from Science Daily)

A new paper is the first to connect the unprecedented West Coast toxic algal bloom of 2015 to the unusually warm ocean conditions -- nicknamed "the blob" -- in winter and spring of that year.

New Climate Projections Aim to Better Represent Extreme Events (from Scripps)

A publicly available, next-generation climate modeling dataset with improved local-scale climate projections for northern Mexico to southern Canada was released yesterday. The dataset was the result of a collaborative effort, including the Southwest CSC, and makes use of a new downscaling method known as local constructed analogs (LOCA). Among the applications provided by the new dataset will be investigations of changes in intensity and frequency of extreme weather conditions. [Learn more >>](#)

Northwest Passage clear of ice again in 2016 (from NOAA.gov)

The Northwest Passage across the Canadian Arctic opened once again in 2016 as sea ice reached its second lowest extent on record.

September 2016 ENSO update *(from Climate.gov)*

Cooling our heels - The odds of La Niña have dropped since last month, and forecasters have dropped the La Niña Watch. Our blogger explains what's happening.

SPECIES AND HABITATS

Forty Years of Change: a seabird responds to a melting Arctic *(from CNN)*

When George Divoky first started studying black guillimots in the 1970s, he was working on a federal contract. He wasn't interested in climate change. Warming just happened to happen while he was there. Surprised by what he saw -- Arctic sea ice this year was just two-thirds the [1981-to-2010 average](#) -- he devoted his life to monitoring this one bird on this one island, hoping his research would help the rest of us understand the consequences of a warming world.

Heat is stunting growth of Douglas firs *(From NPLCC)*

A new study published in the Proceedings of the National Academy of Sciences examines the impact heat- and water-stress have on the productivity of Douglas firs. Scientist Christina Restaino from the University of California, Davis and her colleagues collected 2,000 tree cores from 122 locations across the western U.S in order to obtain a snapshot of Douglas fir response to climate signals between 1916 and 2006. The study found that rising temperatures remove water from both the soil and atmosphere, causing the Douglas firs to lose water faster than they can take it in. As a result, the stressed trees close their stomata (the tiny pores that take in carbon dioxide during photosynthesis and release oxygen), consequently stunting their growth and becoming less effective at storing carbon.

Increasing regional to global-scale resilience in a climate constrained world *(From WSU)*

Resilient natural resource management hinges on understanding the complex and interdependent relationships between food, energy and water (FEW). In the Columbia River Basin (CRB), these issues revolve around the competition for limited surface water resources to sustain irrigated agriculture, hydropower generation, and in-stream flow requirements for endangered fish populations. This proposal seeks to develop a framework for achieving maximum co-benefits between FEW sectors to foster CRB resilience. Using conceptual and bio-physical regional models, this project will evaluate FEW innovations in technology and institutions across multiple spatio-temporal scales and develop storage management strategies that incorporate stakeholder feedback to identify, legitimize and remove barriers to innovative solutions

Climate & Lobsters *(From Climate.gov)*

For New Englanders, the saying "as American as apple pie" may as well be "as New England as lobster," but warming sea surface temperatures from climate change are forcing populations of the American lobster to higher latitudes than ever before-and upending fishing communities on the New England coast.

Forest Management in the Face of Drought *(from Western Forester)*

The June/July/August 2016 edition of Western Forester features articles on managing forests in the face of drought and a changing climate. Articles include:

Annual Drought Effects Readily Visible, by DNR's Karen Ripley

Defining and Monitoring Drought in the Pacific Northwest, by Kathie Dello, Oregon Climate Service

Forest Management in the Face of Drought: Silvicultural Strategies for Reducing Drought Impacts, by Matt Powers, OSU College of Forestry

Forests, Droughts, and Water: Challenges for the Future, by Timothy E. Link, University of Idaho; Jessica Lundquist, University of Washington; and Susan Dickerson-Lange, Natural Systems Design.

Managing Forests in the Face of Drought: Insects and Pathogens, by Dave Shaw Oregon State University Extension; and Paul Oester OSU Extension.

Some fish are adjusting body defenses to deal with acidification (from NPLCC)

In a recently published study, scientists examined the natural ability of certain fish to adapt to changes in ocean acidification. They found their subject, spiny damselfish, to be capable of adapting to higher CO₂ levels as part of the genetic mechanisms organizing their circadian clocks. This natural ability is driven by the need to accommodate the diurnal variation in ocean CO₂ levels that occurs with the inactivity of photosynthesizing organisms at night. The authors of this study bred damselfish in water with near-future carbon dioxide levels and found that the fish that produced offspring with more flexible circadian clocks were able to better adjust to the high-CO₂ environment.

POLICY, MANAGEMENT AND EDUCATION

Flooding of Coast, Caused by Global Warming, Has Already Begun (from NYTimes.com)

“Federal scientists have documented a sharp jump in this nuisance flooding — often called “sunny-day flooding” — along both the East Coast and the Gulf Coast in recent years. The sea is now so near the brim in many places that they believe the problem is likely to worsen quickly. Shifts in the Pacific Ocean mean that the West Coast, partly spared over the past two decades, may be hit hard, too”

Ecology and Society – Special Feature; The Governance of Adaptation (from Ecology and Society)

This special feature examines how climate change adaptation is being tackled and organized in society, and how it could and should be governed through individual and collective responses at various scales.

How fast will we need to adapt to climate change? (from Science Daily)

What would we do differently if sea level were to rise one foot per century versus one foot per decade? Until now, most policy and research has focused on adapting to specific amounts of climate change and not on how fast that climate change might happen. Using sea-level rise as a case study, researchers have developed a quantitative model that considers different rates of sea-level rise, in addition to economic factors, and shows how consideration of rates of change affect optimal adaptation strategies.

Integrating Climate Change into National Security Planning (from Whitehouse.gov)

President Obama signed a Presidential Memorandum (PM) on Climate Change and National Security, establishing a policy that the impacts of climate change must be considered in the development of national security-related doctrine, policies, and plans. To achieve this, 20 Federal agencies and offices with climate science, intelligence analysis, and national security policy development missions and responsibilities will collaborate to ensure the best information on climate impacts is available to strengthen our national security. The Presidential Memorandum was released alongside a report from the National Intelligence Council identifying pathways through which climate change will likely pose significant national security challenges for the United States over the next two decades, including threatening the stability of other countries.

Paris Climate Agreement to Take Effect Nov. 4 (from NYTimes.com)

The landmark Paris agreement on climate change will enter into force on Nov. 4, after a coalition of the world's largest polluters and small island nations threatened by rising seas pushed it past a key threshold

USEFUL CLIMATE LINKS *(with thanks to the NPLCC for help in compiling this list)*

Monthly Climate Newsletter for Washington State

Office of the Washington State Climatologist (OWSC)

National Integrated Drought Information System (NIDIS)

Pacific Northwest Drought Portal

Monthly U.S. and Global Climate Reports

National Centers for Environmental Information (NOAA), Climate Monitoring Division

University of Washington's Climate Impacts Group

The Climate Impacts Group (CIG) is an internationally recognized interdisciplinary research group studying the impacts of natural climate variability and global climate change ("global warming"). Visit their web page for access to research articles and other resource documents, including the [State of Knowledge Report; Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers \(2013\)](#), and [State of Knowledge Report State of Knowledge: Climate Change in Puget Sound \(2015\)](#)

Landscape Conservation Cooperatives

Landscape Conservation Cooperatives (LCCs) are a network of partnerships working in unison to ensure the sustainability of America's land, water, wildlife, and cultural resources. To learn more about the two LCCs in Washington, please visit [North Pacific LCC](#) and the [Great Northern LCC](#). For even further information on LCCs please visit the [LCC Network page](#).

Northwest Climate Science Center

The Northwest Climate Science Center provides climate science and decision support tools to address conservation and management issues in the Pacific Northwest Region.

The NW CSC is part of a national network of [Climate Science Centers \(CSCs\)](#) providing actionable scientific information, tools, and techniques that land, water, wildlife, and cultural resource managers and other interested parties can apply to anticipate, monitor, and adapt to climate change impacts.

Climate.gov

NOAA Climate.gov is intended to be a source of timely and authoritative scientific data and information about climate. Our goals are to promote public understanding of climate science and climate-related events, to make our data products and services easy to access and use, to provide climate-related support to the private sector and the Nation's economy, and to serve people making climate-related decisions with tools and resources that help them answer specific questions

The Oregon Climate Change Research Institute (OCCRI), based at Oregon State University (OSU), is a network of over 150 researchers at OSU, the University of Oregon, Portland State University, Southern Oregon University, and affiliated federal and state labs.

PNW Tribal Climate Change Network

The PNW Tribal Climate Change Network fosters communication between tribes, agencies, and other entities about climate change policies, programs, and research needs pertaining to tribes and climate change.

National Fish, Wildlife, and Plants Climate Adaptation Strategy

The National Fish, Wildlife, and Plants Climate Adaptation Strategy is aimed at providing a unified approach—reflecting shared principles and science-based practices—for reducing the negative impacts of climate change on fish, wildlife, plants, habitats and associated ecological processes across geographic scales.

Climate Change, Wildlife, and Wildlands Toolkit

The Climate Change, Wildlife and Wildlands Toolkit for Formal and Informal Educators is an updated and expanded version of the award-winning and very popular Climate Change, Wildlife and Wildlands Toolkit for Teachers and Interpreters, which was first published in 2001. The kit is designed for classroom teachers and informal educators in parks, refuges, forest lands, nature centers, zoos, aquariums, science centers, etc., and is aimed at the middle school grade level.

FWS Climate Change Information Toolkit

A key part of the Service's climate change strategy is to inform FWS staff about the impacts of accelerating climate change and to engage partners and others in seeking collaborative solutions. Through shared knowledge and communication, we can work together to reduce the impacts of climate change on fish, wildlife, plants and their habitats. Here are some **resources** that can help.